

LITERATURE TO LAST: DESIGN FOR A UNIVERSAL DIGITAL MEDIUM

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*And on the pedestal these words appear:
"My name is Ozymandias, King of Kings;
Look on my works, ye Mighty, and despair!"
Nothing beside remains. Round the decay
Of that colossal wreck, boundless and bare
The lorn and lonesome sands stretch far away.*

-- Percy Bysshe Shelley

The term "literature" is often taken as meaning something Poetic and Cultural: perhaps having to do with coffeehouses, garrets, salons, and the lives of artists. But the word "literature" simply refers to "what is written," including the writings at the bases of statues, the fine print on a ticket, the Rosetta Stone. "Literature" is also used to refer to the works about any particular subject: the literature of science, the literature of biology. And, in its most general sense, literature means all writing.

And literature is cultural in a deeper sense than art: literature represents, and is, the final embodiment of any culture. It is what remains.

Eventually buildings fall down; ancient Greece and Rome still have pieces of architecture standing, but we know what those buildings are, and others were, from what is written. Literature, what is written, is the connective tissue that gives meaning to everything else.

INTERCONNECTED DOCUMENTS

Literature needs to be understood in a larger sense that is becoming clear.

We have been misled by books and libraries into thinking we understood literature; but now, in the age of electronic media, it is becoming clear that there is a larger sense of literature that we did not understand. Literature is the system of *interconnected* documents. The connections are as much a part of the literature as the objects themselves.

And when I say "documents," I mean not just written objects, but movies, symphonies, lab reports-- any human production of text or pictures or audio or other media, any package of information.

The connections between them may not be apparent. But every book refers to others, explicitly and implicitly; every movie has connections to what came before. Sometimes these connections are visible, sometimes they are not. But they are always there. The new interactive hypermedia make it possible to show and follow these connections electronically.

NETWORK PUBLISHING

Tomorrow's publishing will be very different from today's. The impact of the World Wide Web, the hypertext interface to the Internet, has been spectacular. But what next? All agree that digital media will come on networks from Servers, but in what ways? The structure and strategies of delivery, ownership, sale and licensing have sweeping effects on what can be used, and known, by whom.

I believe that tomorrow's media will be different and they will be the same. They will be different because they will be interactive from network, variations and extensions of the kinds of hypermedia we see already. And they will be the same because they will still put forth human ideas and points of view.

WHAT THE XANADU PROJECT ENDEAVORS TO DO

The Xanadu project* has a somewhat legendary status, due to its broad objectives and apparently considerable influence: indirect results of Project Xanadu already include, arguably, World Wide Web, HyperCard** and Lotus Notes**. However, no software product of significance has as yet come out of it directly.

The Xanadu project may be traced to a paper of thirty years ago (1) which introduced not only the words "hypertext" and "hypermedia," but also the ideas of transparallel electronic media and transclusion (not under those names).

By transparallel media I mean any media where objects may be seen together with specific connections shown between their parts. (Examples from paper publishing include: biological illustrations with captions; columnar presentation of text with side-by-side commentary.) In transparallel media, the reader or user sees, and may seek to understand, at least three things: the first object, the second object, and the interconnections.

This has always been a fundamental aspect of Project Xanadu. Most people did not understand this. They were so alarmed, perplexed and amused to hear us talk about vast, anarchic network publishing by individuals-- a preposterous concept, almost everyone thought-- that they did not hear the structural aspects of the system we have been endeavoring to create.

A key objective of Project Xanadu has always been to allow transparallel, connected intercomparison among citations and quotations across the electronic docuverse. So you could call up any document and say, "who has made connections to this?" and see those other documents with it, side by side, on the same screen at the same time. Links would show as colored lines from frame to frame. And quotations, which we intended to be freely allowed, would show as connected by bands of color on the screen.

Some people have suggested that we could only imagine such things because we did not know how computers worked. On the contrary: we studied how computers worked in order to achieve this exact objective. And the technical center that we found we call transclusion. It has been the fundamental quark-level idea of the Xanadu project.

Transclusion (which we now sometimes call "hot quote" or "live sharing") means having access to the original of a piece of media from each of its occurrences. (Thus a re-use or a quotation needs to be more than just a byte copy; the connection needs to be maintained by some software means. That is the difference between a transclusion and a "copy.") It is equivalent to putting *the original piece of media* (not a copy) in *many separate contexts*.

Transclusion has many purposes. Foremost among these are intercomparison of context for understanding, and a clean solution for copyright (to be discussed below).

OPEN TRANSMEDIA

Above all, the Xanadu project has promoted this as *a general meta-design for all media*, where transclusion may be used freely for both understanding and convenience. We now call this *general open transmedia* (as described in (2), before that term was coined)-- an environment where anyone may quote and link to anything, without copyright hindrance. We would like to make such an environment universal.

World Wide Web has shown the benefits of network hypertext publishing. As people grow more sophisticated on the Web, though, they begin to experience concretely the inconvenience of having only one-way links, no way to follow them to their origin, no way to quote material already published by others, and no stable committed publication: Web pages disappear unpredictably like popping bubbles. The Xanadu design was created in anticipation of all these problems.

The implementation of the Xanadu software package sponsored at Autodesk from 1988 to 1992 is still underway (2), but considerably hampered by lack of resources. Meanwhile, new large-scale designs and new implementations are underway, based on the realities of the Internet and such developments as the apparent coup d'etat of the Internet by Netscape.

In the meantime, at the Sapporo HyperLab, we have begun a back-to-basics implementation of the earlier concept. People need to understand the usefulness of transclusion, both for reading and writing, even just locally and by large chunks (4).

I have also worked out a new copyright doctrine (5) which will make possible on the World Wide Web the kind of unhampered re-use we always designed into the Xanadu system.

These are modest steps. But we believe that tomorrow's media-- though they will be profoundly similar to the media of the past, in expressing human thoughts and perspectives-- must have features of availability and understandability that have never yet been available. Transparallel display and transclusion, we believe, are two vital steps in that direction.

A TIME OF PERIL

We are entering a time of peril. We know now that earth's life, including humans, exists in a fragile ecosystem. There is also prima facie evidence that the human race is approaching a demographic climax: a maximum population that will be the largest possible, and that it will be only temporary. (The limit of "standing room only," which Heinz von Foerster predicted for the second decade of the twenty-first century, will probably not be reached.) And then there will be some sort of population collapse, of whose unpleasant details we presently know nothing.

TOMORROW'S POSTERITY

Even as we know it now, modern human life exists as a fragile tissue. To see the fires of the Kobe earthquake burn out of control warns us how easily the entire establishment of life as we know it can be smashed.

How will our literature survive a time of potential terrorism and other terrible dangers, let alone dwindling budgets? Where will we put tomorrow's literature, and who will save it, and how?

We do not know the future; we do not know who will come after us. But we want them to know us. Ultimately all they will have of us will be the literature we leave them.

All of the human past that reaches the future must survive the present. And all ideas and knowledge must either join this new electronic literature, in a survivable form, or disappear.

A LITERATURE FOR TOMORROW

It is vital for the survival of humanity that we maintain our information base, even as it grows more complex. The power of hypertext and hypermedia is now partly understood. The power of transclusive hypertext, and general open transmedia, awaits us. We need it badly.

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